references, because of its maintenance of antigenic epitopes, presumably in native-like form, and due to the presence of gp160 dimeric and tetrameric structures in this preparation.

Depending on the isolate or clone used, the o-gp160 protein preparation can have a lower molecular weight. For example in the 451 isolate described in detail herein, the gp160 monomer appears to have a molecular mass of about 140 kDa due to a truncation which had not previously been recognized. Such a lower molecular mass truncation variant could be referred to as "gp140" or "o-gp140" due to its apparent molecular mass of about 140 kDa rather than 160 kDa.

The compositions of the present invention include variants gp160, whether they be amino acid substitution variants (either natural isolates or genetically engineered variants) as well as truncation variants which may have occurred inadvertently (as is believed to be the case for the 451 isolate) or have been deliberately prepared for any of a number of reasons, including improved secretion from cells. Thus, as used herein, the term "gp160" is intended to encompass the disclosed truncation variant and other presently known or later discovered truncation variants and amino acid substitution variants of gp160.

In a preferred embodiment described below the o-gp160 was obtained from the HIV-1 isolate originally named HTLV-III_{451}. This protein is listed on the SWISS-PROT database, (maintained by the National Center for Biotechnology Information of the National Institutes of Health, Bethesda, Maryland) as Seq ID: 119434, and was shown to have theamino acid sequence shown below (in single letter code).

This sequence (SEQ ID NO:1) is divided as follows: residues 1-32 are the signal peptide ending with the "/" mark. Residues 33-522 constitute gp120, ending with the "\" mark. Residues 523-868 constitute gp41. It was subsequently discovered that this clone was truncated, with the C-terminal 187 amino acids of gp41 missing. These are indicated by underscoring in the sequence below. Thus, the o-gp160 protein as obtained from the cloned cell line described below has only 649 residues (from position 33 to 681 of SEQ ID NO:1).

It is noteworthy that a large hydrophobic region of gp160 is retained in this protein and is indicated in the above sequence in italic and boldface and double underscore. This 29mer (from positions 523 to 551) is an example of an endogenous hydrophobic sequence and can be exploited in the vaccine composition.

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  1  MAMRAKGIRK NCQHLWRWGT MLLGMLMICS AA/ANLWVTVY YGVPVWKEAT
 51  TTLFCASDAK AYDTEAHNVW ATHACVPTNP NPQEVVLENV TENFNMWKNN
101  MVEQMHEDII SLWDQSLKPC VKLTPLCVTL NCTDLNTNNT TNTTELSIIV
151  VWEQRGKGEM RNCSFNITTS IRDKVQREYA LFYKLDVEPI DDNKNTTNNT
201  KYRLINCNTS VITQACPKVS FEPIPIHYCT PTGFALLKCN DKKFNGTGPC
251  TNVSTVQCTH GIRPVVSTQL LLNGSLAEEE VVIRSENFTN NAKTIIVQLN
301  VSVEINCTRP NNHTRKRVTL GPGRVWYTTG EILGNIRQAH CNISRAQWNN
351  TLQQIATTLR EQFGNKTIAF NQSSGGDPEI VMHSFNCGGE FFYCNSTQLF
401  NSAWNVTSNG TWSVTRKQKD TGDIITLPCR IKQIINRWQV VGKAMYALPI
451  KGLIRCSSNI TGLLLTRDGG GENQTTEIFR PGGGDMRDNW RSELYKYKVV
501  KIEPLGVAPT KAKRRVVQRE KR\AVGMLGAM FLGFLGAAGS TMGATSMALT
551  VQARQLLSGI VQQQNNLLRA IKAQQHLLQL TVWGIKQLQA RILAVERYLK
601  DQQLLGFWGC SGKLICTTAV PWNASWSNKT LDQIWNNMTW MEWDREIDNY
651  THLIYTLIEE SQNQQEKNQQ ELLQLDKWAS LWTWSDITKW LWYIKIFIMI
701  VGGLIGLRIV FAVLSIVNRV RQGYSPLSFQ TLLPNPRGPD RPEGTEEGGG
751  ERGRDGSTRL VHGFLALVWD DLRSLCLFSY HRLRDLLLIV ARIVELLGRR
801  GWEVLKYWWN LLQYWSQELK NSAVSLVNVT AIAVAEGTDR VIEVVQRIYR
818  AFLHIPRRIR QGFERALL
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Cell Culture and Production of oligo-gp160

A single cell clone of HUT78 cells has been infected with human immunodeficiency virus type 1 (HIV-1), resulting in a cell line which continuously produces virus. Clone 6D5 is susceptible to chronic infection with HIV-1, as described in Getchell, *et al., J. Clin. Microbiol. 23*:737-742 (1986). Clone 6D5 is infected with a specific strain of HIV-1, HTLV-III_{451}, to produce the infected cell line 6D5451 (deposited with the American Type Culture Collection under the Budapest Treaty). The infected cell line is then grown in serum-free medium, by pelleting 6D5451 cells and resuspending them in serum-free medium (such as HB101 or HB104 medium, commercially available from Du Pont). The medium also contains growth supplements such as transferrin, insulin, and bovine serum albumin. To assist in the growth of cells, the cells were subcultured every four days. The 6D5451 cells were grown for 2 to 3 generations. When serum-free